EXECUTIVE SUMMARY

PROJECT PROPONENT

Project Proponent	Proposed Project	Extent
Tmt. R. Jeyachithra, W/o. Rengaraj, No. 2/12, Melatheru, Shanmugapuram, Melapandiyapuram, Kailasapuram, Thoothukudi District – 628 301.	**S.F.Nos:** 36/2A(Part), 36/2B(Part), 36/3(Part), 37/1(Part), 50/1(Part) and 50/3(Part) – Kollamparambu Village, Ottapidaram Taluk, Thoothukudi District	**4.82.10 ha**

TMT. R. JEYACHITHRA ROUGH STONE & GRAVEL QUARRY

"B1" CATEGORY – MINOR MINERAL – CLUSTER – NON-FOREST LAND

CLUSTER EXTENT = 9.81.10 ha

At

Kollamparambu Village, Ottapidaram Taluk, Thoothukudi District

Complied as per ToR obtained

File No. 13605 ToR Identification No. TO26B0108TN5279712N
Dated.11.05.2026

Environmental Consultant

GEO EXPLORATION AND MINING SOLUTIONS

Old No. 260-B, New No. 17,
Advaitha Ashram Road, Alagapuram,
Salem – 636 004, Tamil Nadu, India
Accredited for sector 1 Category 'A', 31 Category 'B' & 38 Category 'B'
Certificate No : NABET/EIA/2225/RA 0276 Dated: 06.08.2025
Phone: 0427-2431989,
Email: ifthiahmed@gmail.com, geothangam@gmail.com
Web: www.gemssalem.com

Laboratory

CHENNAI METTEX LAB PRIVATE LIMITED,
(Approved by AAI, AGMARK, APEDA, BIS, EIC FSSAI, GAFTA, IOPEPC, MOEF & TEA BOARD)
Certificate No : ISO/IEC 17025:2017 Dated: 16.06.2024
Valid Upto: 15.06.2026
Jothi Complex, 83,
M.K.N Road, Guindy,
Chennai – 600 032.

BASELINE MONITORING PERIOD - March 2026 to May 2026

* Calculated as per MoEF & CC Notification – S.O. 2269(E) Dated: 01.07.2016

1. INTRODUCTION

The project proponent Tmt. R. Jeyachithra has applied for Rough Stone and Gravel quarry over an extent of 4.82.10 Ha in S.F.Nos. 36/2A(Part), 36/2B(Part), 36/3(Part), 37/1(Part), 50/1(Part) and 50/3(Part) of Kollamparambu Village, Ottapidaram Taluk & Thoothukudi District.

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 04.10.2024
- Precise Area Communication Letter was issued by the Assistant Director, Thoothukudi R.C. No: G.M.1/760/2025, Dated: 09.03.2026.
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Thootukudi District, vide R.C. No: G.M.1/760/2025, Dated: 16.03.2026
- The proposed project falls under "B1" Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- Proponent applied for ToR for Environmental Clearance vide online Proposal No. SIA/TN/MIN/574308/2026 Dated: 03.04.2026.
- The proposal was placed in 706th SEAC meeting held on 17.04.2026 and the committee recommended for issue of ToR.
- The proposal was considered in 1003rd SEIAA meeting held on 05.05.2026 and issued ToR vide File No.13605 TOR Identification No. TO26B0108TN5279712N Dated:11.05.2026.
- As per the EIA Notification, 2006 and subsequent amendments and OM The proposal falls in the B1 Category (Cluster quarries – 1 proposal, 1 Existing quarry forming Cluster Category {Total Extent of the Cluster is 9.81.10 Ha}- Cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016).

Based on the ToR Baseline Monitoring study has been carried out for one season (Pre-Monsoon) i.e., **March – May 2026** and this EIA and EMP report is prepared for considering cumulative impacts arising out of these projects, the Cumulative Environmental Impact Assessment study is undertaken, which is followed by preparation of a detailed Environmental Management Plan (EMP) to minimize those adverse impacts.

Environmental Impact Assessment (EIA) is the management tool to ensure the sustainable development and it is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for any project. EIA systematically examines both beneficial and adverse consequences of the project and ensures that these impacts are taken into account during the project designing. It also reduces conflicts by promoting community participation, information, decision makers, and helps in developing the base for environmentally sound project.

"Draft EIA report prepared on the basis of ToR Issued & Standard ToR for carrying out Public Hearing for the Grant of Environmental Clearance from SEIAA, - Tamil Nadu"

1.1 DETAILS OF PROJECT PROPONENT –

Name of the Project	Tmt. R. Jeyachitra Rough Stone & Gravel Quarry
S.F. No.	36/2A(Part), 36/2B(Part), 36/3(Part), 37/1(Part), 50/1(Part) and 50/3(Part)
Extent	4.82.10 ha
Land Type	Patta Land
Village Taluk and District	Kollamparambu Village, Ottapidaram Taluk, Thoothukudi District

Source: Approved Mining Plan

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

Propsed Quarries				
Code	**Name of the Proponent and Address**	**S.F. Nos & Village**	**Area (Ha)**	**Status**
P1	Tmt. R. Jeyachitra	36/2A(Part), 36/2B(Part), 36/3(Part), 37/1(Part), 50/1(Part) and 50/3(Part) - Kollamparambu	4.82.10	File No. 13605 ToR Identification No. TO26B0108TN5279712N Dated: 11.05.2026
		Total	**4.82.10**	
Existing Quarries				
CODE	**Name of the Proponent and Address**	**S.F. Nos**	**Extent in Ha**	**Lease Period**
E-1	Thiru. A. Arulrajan	22/1(P), 56/1, 56/2(P), 57/1, 57/2(P)	4.99.00	06.03.2026 – 05.03.2031
		Total	**4.99.00**	
Expired/ Abandoned Quarries				
--------- Nil --------				
		Total	**9.81.10**	
		Total Cluster Extent	**9.81.10 Ha**	

Note: -Cluster area is calculated as per MoEF & CC Notification – S.O. 2269 (E) Dated: 01.07.2016

1.3 SALIENT FEATURES OF THE PROPOSAL

DESCRIPTION OF THE PROJECT

Name of the Quarry	**Tmt. R. Jeyachitra Rough Stone & Gravel Quarry**	
Toposheet No	58L/1	
Land Classification	It is a Patta Land, Registered in the name of the proponent (Tmt. R. Jeyachitra) vide patta nos.1167, 1168 and 1188.	
Latitude between	08°58'57.98"N to 08°59'04.13"N	
Longitude between	78°06'27.27"E to 78°06'37.98"E	
Highest Elevation	100m AMSL	
Proposed Depth of Mining as per Tor	60m (5m Gravel + 55m Rough Stone)	
Geological Resources	Rough Stone in m^3	Gravel m^3
	26,47,700	2,40,700
Mineable Reserves	Rough Stone in m^3	Gravel m^3
	9,15,400	1,96,550
Yearwise production for first five years	Rough Stone in m^3	Gravel m^3
	4,62,410	1,96,550
Yearwise production for Second five years	Rough Stone in m^3	Gravel m^3
	4,52,990	-
Ultimate Pit Dimension	Pit I: 192m (L) x 144m (W) x 60m (D) Bgl Pit II: 98m (L) x 119m (W) x 55m (D) Bgl	
Water Level in the surrounds area	93-98 m bgl	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	

Topography	The lease applied area is plain terrain. The area has gentle sloping towards Northeastern side and altitude of the area is 100m (max) above from Mean Sea level. The area is covered by 5m thickness of Gravel and followed by Massive Charnockite which is clearly inferred from the nearby quarry pits. The Water level in the area is 93m -98m below general ground profile. Average annual rainfall is about 694 mm.	
Machinaries	Wagon Drill Machine	**1 No**
	Jack Hammer	**2 Nos**
	Compressor	**1 Nos**
	Excavator with bucket and rock breaker	**2 Nos**
	Truck	**4 Nos**
	Water Sprinkling Tanker	**2 No**
Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Proposed Manpower Deployment	31 Nos	
Project Cost	Rs.4,07,14,000/-	
CER Cost	Rs. 5,00,000/-	
Nearby Water Bodies	**Water bodies**	**Distance & Direction**
	Odai	10m Safety-South Side
	Urani	170m NW
	Tank	470m NE
	Odai	1.9km NE
	Tank	2.4km SW
Greenbelt Development Plan	Proposed to plant 2,400 trees in the 7.5m Safety Zone, Village Road and panchayat roads.	
Proposed Water Requirement	7.0 KLD	
Nearest Habitation	1.0km East	

Source: Approved Mining Plan

1.4 STATUTORY DETAILS

SCREENING

- The proponent applied for Rough Stone and Gravel Quarry Lease Dated: 08.10.2025
- Precise Area Communication Letter was issued by the Assistant Director, Thoothukudi R.C. No: G.M.1/760/2025, Dated: 09.03.2026.
- The Mining Plan was prepared by Recognized Qualified Person and approved by Assistant Director, Geology and Mining, Thootukudi District, vide R.C. No: G.M.1/760/2025, Dated: 16.03.2026.
- Proponent applied for ToR for Environmental Clearance vide online Proposal No. SIA/TN/MIN/574308/2026 Dated: 03.04.2026.

SCOPING

- The proposal was placed in 706th SEAC meeting held on 17.04.2026 and the committee recommended for issue of ToR.
- The proposal was considered in 1003rd SEIAA meeting held on 05.05.2026 and issued ToR vide File No.13605 TOR Identification No. TO26B0108TN5279712N Dated:11.05.2026.

2. PROJECT DESCRIPTION

The proposed projects are site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarries.

Rough Stone is proposed to be excavated by opencast mechanized method involving splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers and rock breakers to avoid secondary blasting.

2.1 SITE CONNECTIVITY TO THE PROJECT AREA

Nearest Roadway	NH-38 Thoothukudi - Madurai – 4.2km -South West side SH-75 Vilanthikulam - Tirunelveli – 4.0km -South East Side
Nearest Village	Kollamparambu – 1.0km - East
Nearest Town	Ottapidram – 12 km – South West
Nearest Railway	Thoothukudi Railway station – 20.3Km – South East
Nearest Airport	Thoothukudi – 30 km – South West
Seaport	Thoothukudi - 20 km – South East

2.2 LAND USE PATTERN OF THE LEASE APPLIED AREA

Description	Present area in (ha)	Area required during the first five years of plan period (ha)	Area at the end of lease period (ha)
Quarrying Pit	Nil	3.93.1	3.93.1
Infrastructure	Nil	0.01.00	0.01.00
Roads	Nil	0.02.00	0.02.00
Green Belt	Nil	0.46.00	0.46.00
Unutilized Area	4.82.10	0.40.00	0.40.00
Grand Total	**4.82.10**	**4.82.10**	**4.82.10**

Source: Approved Mining Plan

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

PARTICULARS	DETAILS	
	Rough Stone (10 Year Plan period)	**Gravel (3 Year Plan period)**
Geological Resources in m^3	26,47,700	2,40,700
Mineable Reserves in m^3	9,15,400	1,96,550
First Five Yearwise Production in m^3	4,62,410	1,96,550
Second Five Yearwise Production in m^3	4,52,990	-
Mining Plan Period	10 Years	3 Years
Number of Working Days	300 Days	
Production per day in m^3	305	18
No of Lorry loads ($12m^3$ per load)	28	73
Total Depth of Mining as per ToR	60m (5m Gravel + 55m Rough Stone)	

Source: Approved Mining Plan

2.4 YEAR-WISE PRODUCTION PLAN

AVAILABLE GEOLOGICAL RESOURCES OF PROPOSED PROJECT

Description	Rough Stone	Gravel
Geological Resource in m^3	26,47,700	2,40,700
Mineable Resource in m^3	9,15,400	1,96,550

YEAR-WISE PRODUCTION PLAN FOR FIRST FIVE YEARS

YEARWISE RESERVES	Rough Stone in m^3	Gravel in m^3
I	96,630	72,000
II	97,030	66,240
III	1,03,000	91,750
IV	91,750	-
V	74,000	-
Total	**4,62,410**	**1,96,550**

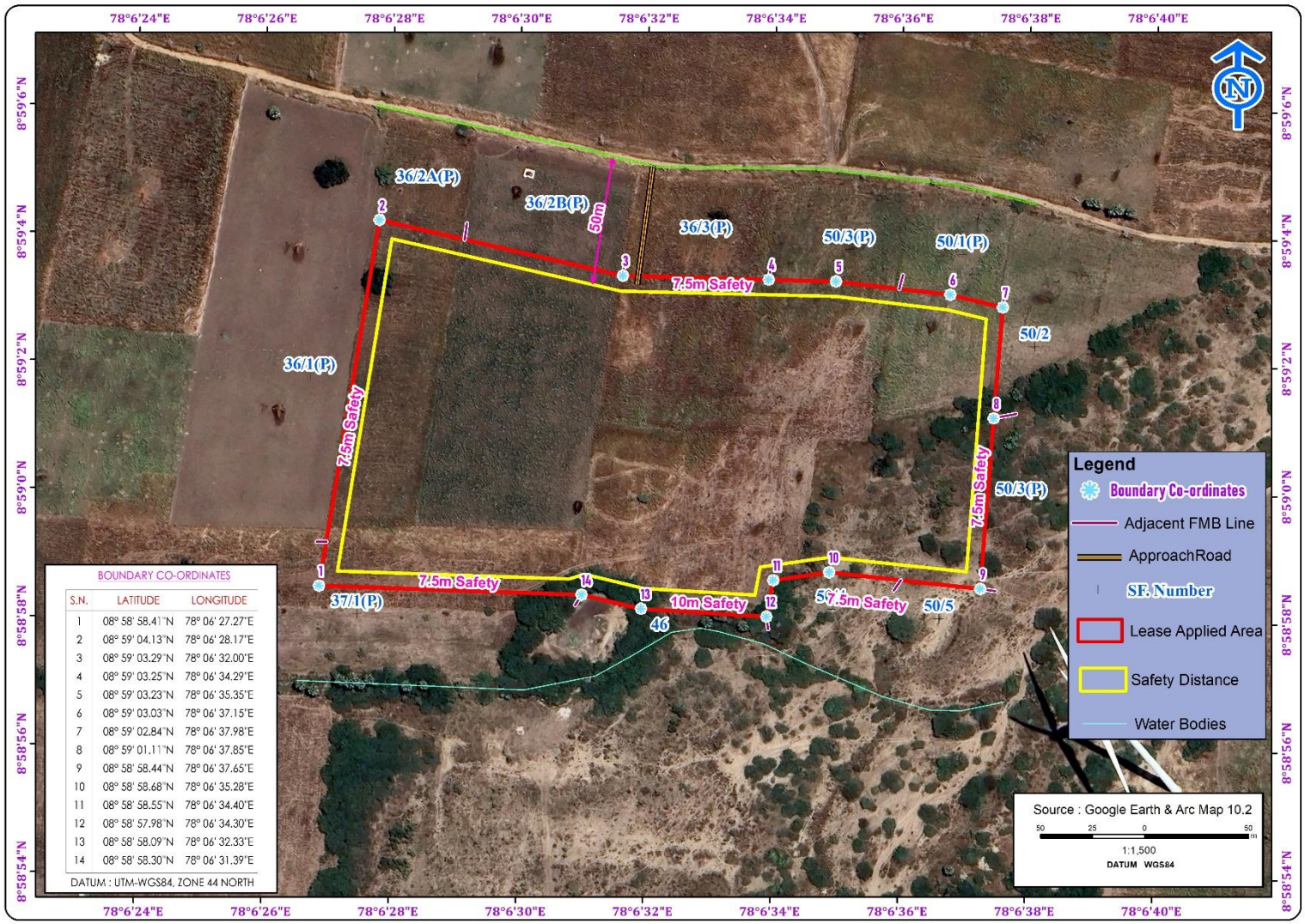
Source: Approved Mining Plan

YEAR-WISE PRODUCTION PLAN FOR SECOND FIVE YEARS

YEARWISE RESERVES	Rough Stone in m^3
VI	91,145
VII	1,02,005
VIII	90,270
IX	81,390
X	88,180
Total	**4,52,990**

Source: Approved Mining Plan

FIGURE – 1: GOOGLE IMAGE SHOWING APPLIED QUARRY LEASE AREA



S.N.	LATITUDE	LONGITUDE
1	08° 58' 58.41"N	78° 06' 27.27"E
2	08° 59' 04.13"N	78° 06' 28.17"E
3	08° 59' 03.29"N	78° 06' 32.00"E
4	08° 59' 03.25"N	78° 06' 34.29"E
5	08° 59' 03.23"N	78° 06' 35.35"E
6	08° 59' 03.03"N	78° 06' 37.15"E
7	08° 59' 02.84"N	78° 06' 37.98"E
8	08° 59' 01.11"N	78° 06' 37.85"E
9	08° 58' 58.44"N	78° 06' 37.65"E
10	08° 58' 58.68"N	78° 06' 35.28"E
11	08° 58' 58.55"N	78° 06' 34.40"E
12	08° 58' 57.98"N	78° 06' 34.30"E
13	08° 58' 58.09"N	78° 06' 32.33"E
14	08° 58' 58.30"N	78° 06' 31.39"E

Source: Google Earth Imagery

FIGURE – 2: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)

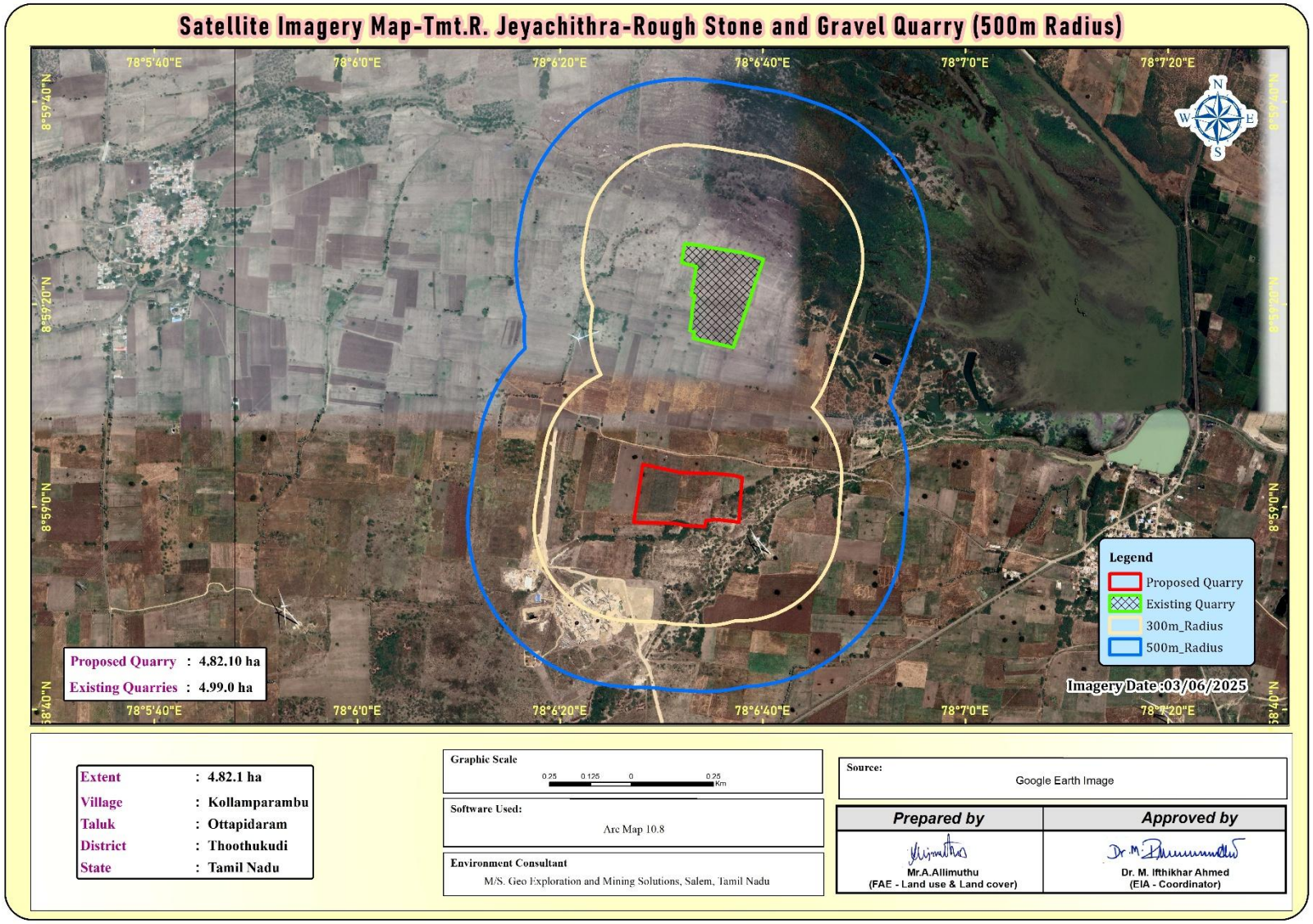


FIGURE – 3: TOPOSHEET MAP COVERING 10 KM RADIUS

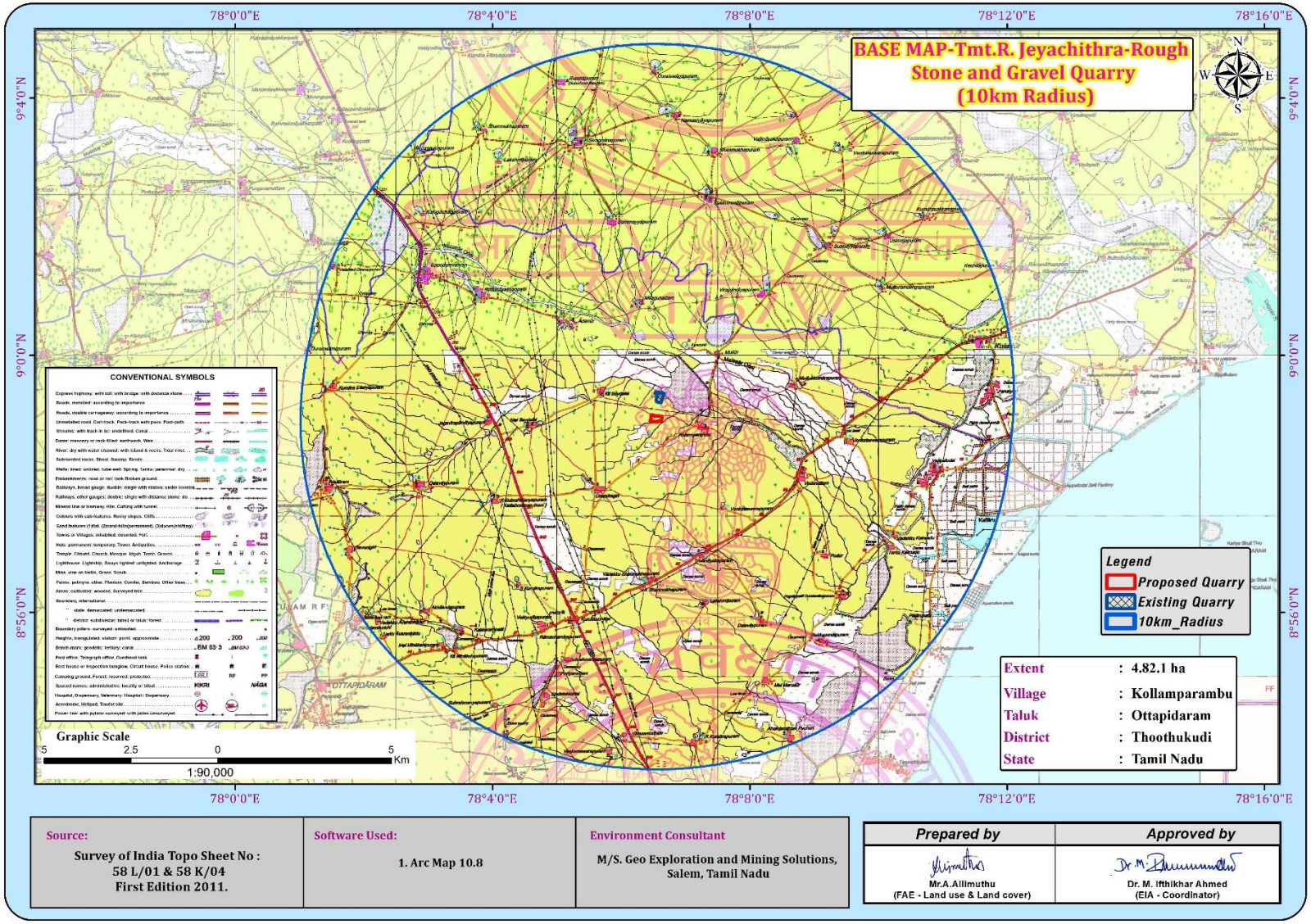
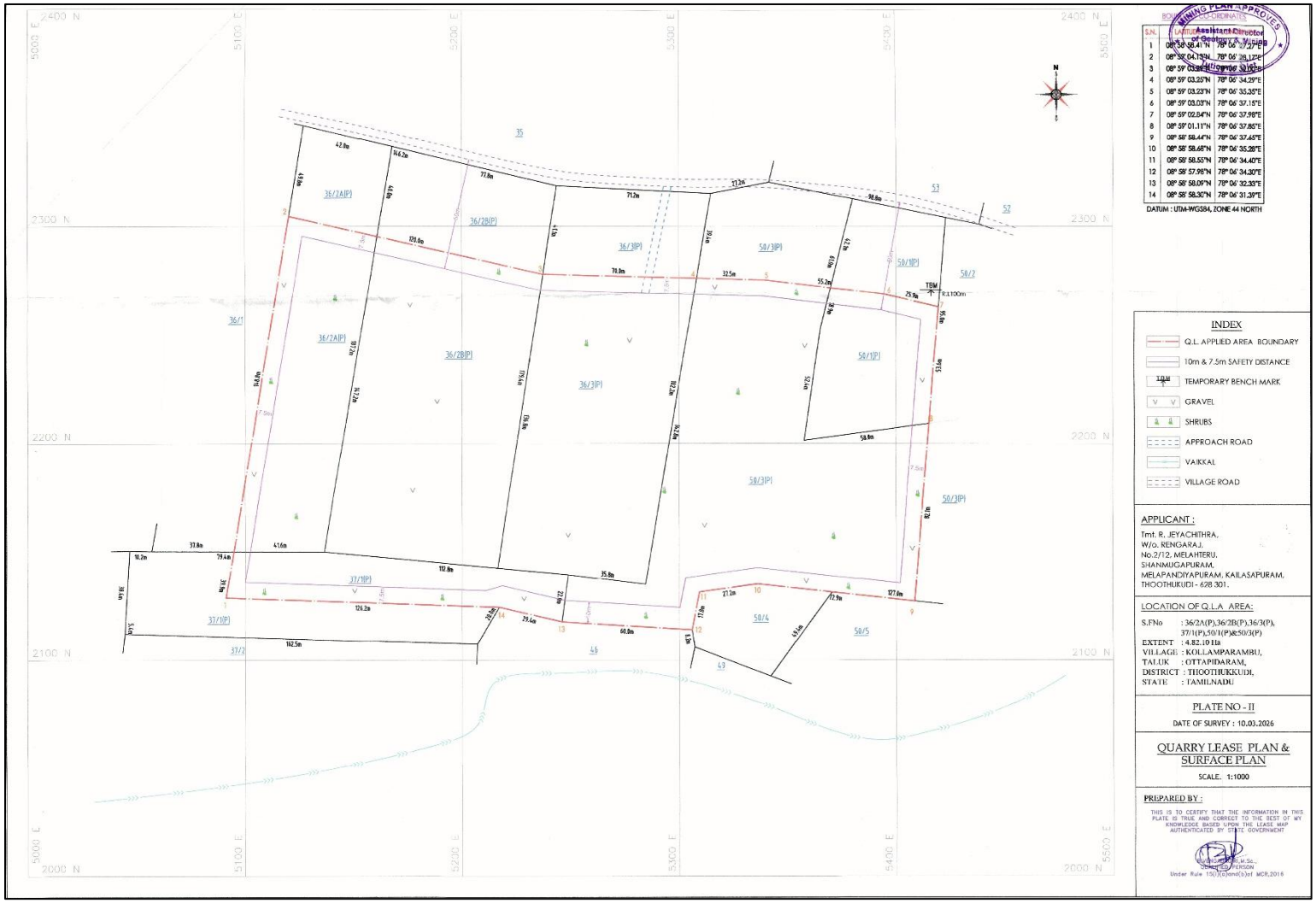


FIGURE. 4: QUARRY LEASE PLAN / SURFACE PLAN



Source: Approved Mining Plan

2.5 METHOD OF MINING

The method of mining is Opencast Mechanized Mining Method is being proposed by formation of 5.0-meter height bench with a bench width not less than the bench height. However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence it is proposed to obtain relaxation to the provisions of the above regulation from the Director of Mines Safety for which necessary provision is available with the Regulation 106 (2) (b) of MMR-1961, under Mine Act – 1952.

The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass will be carried out by deploying jackhammer drilling and Slurry Explosives will be used for blasting. Hydraulic Excavators attached with Rock Breakers unit will be deployed for breaking large boulders to required fragmented sizes to avoid secondary blasting and hydraulic excavators attached with bucket unit will be deployed for loading the Rough Stone into the tippers and then the stone is transported from pithead to the nearby crushers.

2.6 PROPOSED MACHINERY DEPLOYMENT

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Wagon Drill Machine	`1	3m to 10m	Diesel Drive
2	Jack hammers	2	1.2m to 2.0m	Compressed air
3	Compressor	1	400psi	Diesel Drive
4	Excavator with Bucket / Rock Breaker	2	300 HP	Diesel Drive
5	Tippers	4	20 Tonnes	Diesel Drive
6	Water Sprinkling Tanker	2	10,000 litres	Diesel Drive

Source: Approved Mining Plan

2.7 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

- At the end of life of mine, the excavated mine pit / void will act as artificial reservoir for collecting rain water and helps to meet out the demand or crises during drought season.
- After mine closure the greenbelt developed along the safety barrier and top benches and temporary water reservoir will enhance the ecosystem
- Mine Closure is a process of returning a disturbed site to its natural state or which prepares it for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety.
- The principle closure objectives are for rehabilitated mines to be physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/ non-contaminating, and capable of sustaining an agreed post-mining land use.

2.8 ULTIMATE PIT DIMENSION

Section	Length (Max) (m)	Width (Max) (m)	Depth (Max)
XY-AB	192	144	60m bgl
XY-CD	98	119	55m bgl

Source: Approved Mining Plan

3. DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out during March, April and May 2026 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed mine by CHENNAI METTEX LAB PRIVATE LIMITED Approved by AAI, AGMARK, APEDA, BIS, EIC FSSAI, GAFTA, IOPEPC, MOEF & TEA BOARD Notified Laboratory.

3.1 ENVIRONMENT MONITORING ATTRIBUTES

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land-use Land cover	Land-use Pattern within 10 km radius of the study area	Data's from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio-Chemical Characteristics	Once during the study period	6 (1 core & 5 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (2 surface water & 4 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM_{10} $PM_{2.5}$ SO_2 NO_X Fugitive Dust	24 hourly twice a week (March 2026 – May 2026)	7 (2 core & 5 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	7 (2 core & 5 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio–Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

Source: Onsite Monitoring Data/Sampling by Chennai Mettex Laboratories

The data has been collected as per the requirement of the ToR issued by SEIAA – TN.

3.2 LAND ENVIRONMENT

S.No	CLASSIFICATION	AREA_HA	AREA_%	AREA_HA	AREA_%
	BUILTUP				
1	RURAL	922.40	2.88	117.57	8.50
2	URBAN	451.95	1.41	0.00	0.00
3	MINING	160.67	0.50	103.91	7.51
	AGRICULTURAL LAND				
4	CROP LAND	17656.20	55.08	789.41	57.09
5	PLANTATION	829.34	2.59	64.35	4.65
6	FALLOW LAND	1219.23	3.80	18.09	1.31
	FOREST				
7	FOREST LAND	9314.21	29.05	148.89	10.77
	BARREN/WASTE LANDS				
8	SCRUB LAND	209.58	0.65	76.16	5.51
	WETLANDS/ WATER BODIES				
9	WATER BODIES/LAKE/ RIVER	1294.66	4.04	64.31	4.65
TOTAL		32058.25	100.00	1382.68	100.00

From the above table, pie diagram and land use map it is inferred that the majority of the land in the study area is Agriculture and fallow land (includes crop land) 91.07% followed by Built-up Lands – 2.09%, and Water bodies 4.45%.

The total mining area within the study area is 10.00.00 ha i.e., 0.03%. The cluster area of 9.81.10 ha contributes about 98.11% of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

3.3 SOIL ENVIRONMENT

Physical Characteristics –

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay, Sandy Clay to Sandy Loam Soil and Bulk Density of Soils in the study area varied between 1.02 – 1.19 g/cm^3. The Water Holding Capacity and Porosity of the soil samples is found to be medium i.e. ranging from 23.8 – 39.3 %. and 27.6 – 38.6 %.

Chemical Characteristics –

- The nature of soil is slightly alkaline to strongly alkaline with pH range 4.89 to 6.15
- The available Nitrogen content range between 283 to 412.8 mg/kg
- The available Phosphorus content range between 2.85 to 5.24 mg/kg
- The available Potassium range between 24.3 to 29.7 mg/kg

3.4 WATER ENVIRONMENT

Surface Water

Ph:

The pH varied from 7.68 – 7.91 while turbidity found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH).

Total Dissolved Solids:

Total Dissolved Solids is 640 - 671 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

Other parameters:

Chloride content is 198.9 - 206 mg/l. Nitrates is 9.4 – 19.3 mg/l, while sulphates is 52.6 – 55.2 mg/l

Ground Water

The pH of the water samples collected ranged from 7.43 – 7.74 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 433 522.6 mg/l in all samples. The Total hardness varied between 120 - 156.9 mg/l for all samples.

On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analysed were compared with IS 10500:2012 and are well within the prescribed limits.

3.5 AIR ENVIRONMENT

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 10 km radius around the proposed quarry forms the baseline information.

FIGURE – 5: WIND ROSE DIAGRAM

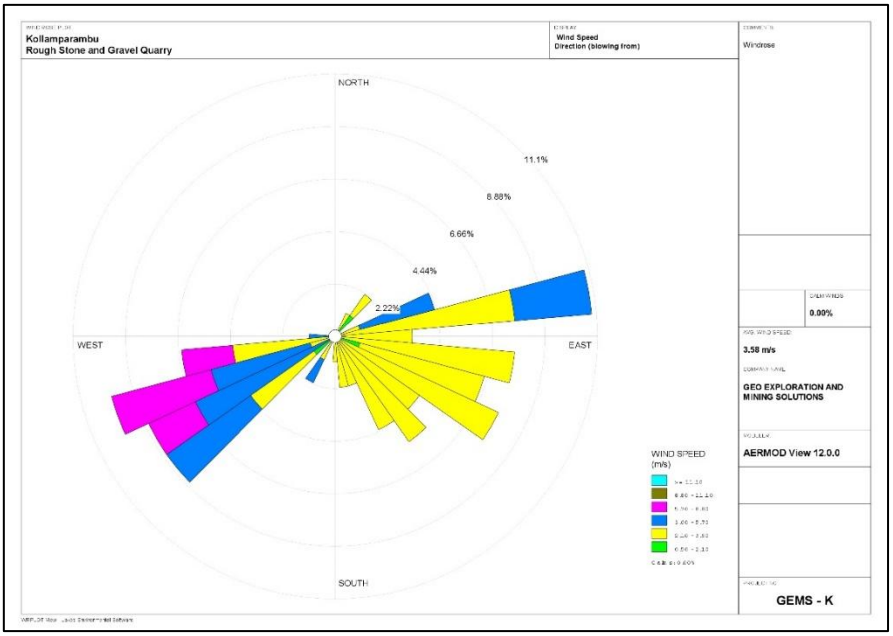
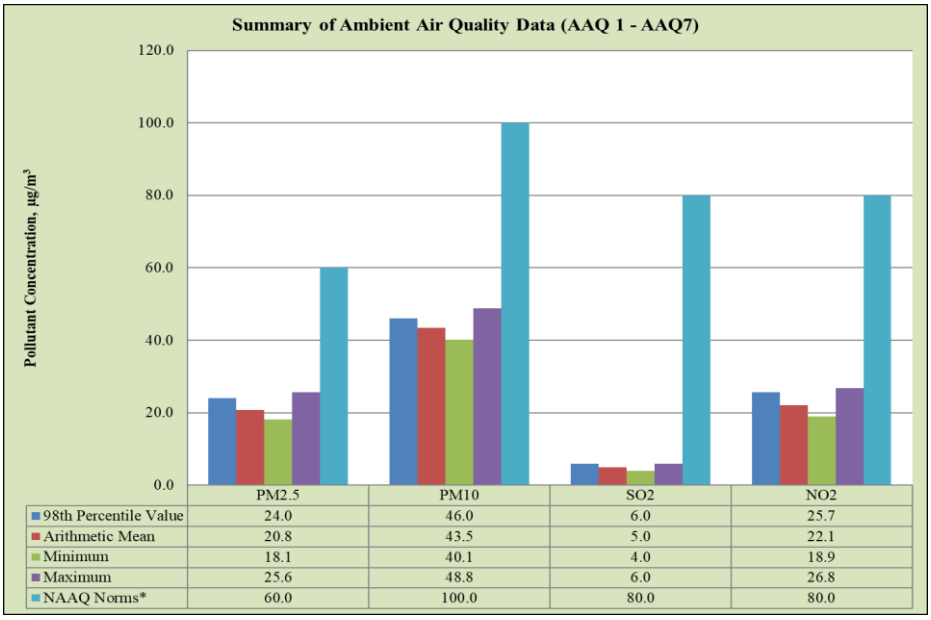


FIGURE – 6: SUMMARY OF AMBIENT AIR QUALITY DATA



The results of ambient air quality monitoring for the period (March 2026 – May 2026) are presented in the report. Data has been complied for three months.

As per monitoring data, PM_{10} ranges from 40.1 µg/m^3 to 48.8 µg/m^3, $PM_{2.5}$ data ranges from 18.1 µg/m^3 to 25.6 µg/m^3, SO_2 ranges from 4.0 µg/m^3 to 6.0 µg/m^3 and NO_2 data ranges from 18.9 µg/m^3 to 26.8 µg/m^3. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

3.6 NOISE ENVIRONMENT

Ambient noise levels were measured at 7 (Seven) locations around the proposed project area. Noise levels recorded in core zone during day time were from 47.4 – 47.8 dB (A) Leq and during night time were 43.1 – 43.6 dB (A) Leq. Noise levels recorded in buffer zone during day time were from 42.5to 45.6 dB (A) Leq and during night time were from 38.4 to 42.9 dB (A) Leq.

Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

3.7 ECOLOGICAL ENVIRONMENT

The study involved in the collection of primary data by conducting a survey in the field, examination of floral and faunal records in previously published reports and records. Analysis of the information is the view of the possible alteration in the environment of the project site. For the survey of fauna, both direct and indirect observation methods were used.

There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area. Hence this small operation over short period of time will not have any significant impact on the surrounding flora and fauna.

3.8 SOCIO ECONOMIC ENVIRONMENT

It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature like temples, historical monuments etc., at the baseline level. This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

The socio-economic study of surveyed villages gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from lack of permanent

job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis.

The proposed projects will aim to provide preferential employment to the local people there by improving the employment opportunity in the area and in turn the social standards will improve.

4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES – FOR PROPOSED QUARRY

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans sustainable resource extraction.

4.1 LAND ENVIRONMENT:

ANTICIPATED IMPACT

- Permanent or temporary change on land use and land cover.
- Change in Topography: Topography of the ML area will change at the end of the life of the mine.
- Movement of heavy vehicles sometimes cause problems to agricultural land, human habitations due to dust, noise and it also causes traffic hazards.
- Due to degradation of land by pitting the aesthetic environment of the core zone may be affected.
- Earthworks during the rainy season increase the potential for soil erosion and sediment laden water entering the water ways.
- If no due care is taken wash off from the exposed working area may choke the water course & can also causes the siltation of water course.

MITIGATION MEASURES

- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative measures like phase wise development of greenbelt etc.
- Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent soil erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area
- Green belt development along the boundary within safety zone. The small quantity of water stored in the Mined out pit will be used for greenbelt
- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir
- In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m safety barrier and other safety provided) so as to help minimise dust emissions.
- Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

4.2 WATER ENVIRONMENT

ANTICIPATED IMPACT

- The major sources of water pollution normally associated due to mining and allied operations are:

  - Generation of waste water from vehicle washing.
  - Washouts from surface exposure or working areas
  - Domestic sewage
  - Disturbance to drainage course in the project area
  - Mine Pit water discharge
- Increase in sediment load during monsoon in downstream of lease area
- This being a mining project, there will be no process effluent. Waste from washing of machinery may result in discharge of Oil & grease, suspended solids.
- The sewage from soak pit may percolate to the ground water table and contaminate it.
- Surface drainage may be affected due to Mining
- Abstraction of water may lead to depletion of water table.

MITIGATION MEASURES

- Garland drains, settling tank will be constructed along the individual mining leases. The Garland drains of the individual leases will be connected to settling tank and after settling the water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water.
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic analysis of quarry pit water and ground water quality in nearby villages
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits
- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes
- De-silting will be carried out before and immediately after the monsoon season
- Regular monitoring and analysing the quality of water in open well, bore wells and surface water

4.3 AIR ENVIRONMENT

ANTICIPATED IMPACT

- During mining, at various stages activities such as excavation, drilling, blasting, and transportation of materials, particular matter (PM), gases such as Sulphur dioxide, oxides of Nitrogen from vehicular exhaust are the main air pollutants.
- Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air.
- The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust.
- Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area.

MITIGATION MEASURES

Drilling – To control dust at source, wet drilling will be practiced. Where there is a scarcity of water, suitably designed dust extractor will be provided for dry drilling along with dust hood at the mouth of the drill-hole collar.

Advantages of Wet Drilling:-

- In this system dust gets suppressed close to its formation. Dust suppression become very effective and the work environment will be improved from the point of occupational comfort and health.
- Due to dust free atmosphere, the life of engine, compressor etc., will be increased.
- The life of drill bit will be increased.
- The rate of penetration of drill will be increased.
- Due to the dust free atmosphere visibility will be improved resulting in safer working conditions.

Blasting –

- Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- Avoid blasting i.e., when temperature inversion is likely to occur and strong wind blows towards residential areas
- Controlled blasting includes Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting blasting to a particular time of the day i.e. at the time lunch hours, controlled charge per hole as well as charge per round of hole
- Before loading of material water will be sprayed on blasted material
- Dust mask will be provided to the workers and their use will be strictly monitored

Haul Road & Transportation –

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- Transportation of material will be carried out during day time and material will be covered with taurpaulin
- The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- Water sprinkling on haul roads & loading points will be carried out twice a day
- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of machines improves combustion process & makes reduction in the pollution.
- The un-metalled haul roads will be compacted weekly before being put into use.
- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Grading of haul roads and service roads to clear accumulation of loose materials.

Green Belt –

- Planting of trees all along main mine haul roads and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of dumpers/trucks
- Green belt of adequate width will be developed around the project areas

Occupational Health –

- Dust mask will be provided to the workers and their use will be strictly monitored
- Annual medical check-ups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers & tipper drivers
- Ambient Air Quality Monitoring will be conducted six months once to assess effectiveness of mitigation measures proposed.

4.4 NOISE ENVIRONMENT

ANTICIPATED IMPACT

Noise pollution poses a major health risk to the mine workers. Following are the sources of noise in the existing open cast mine project are being observed such as Drilling, & Blasting, Loading and during movement of vehicles.

MITIGATION MEASURES

- Usage of sharp drill bits while drilling which will help in reducing noise;
- Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders;
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained;
- The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system;
- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;
- Silencers / mufflers will be installed in all machineries;
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured though training and awareness.
- Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects.

4.5 BIOLOGICAL ENVIRONMENT

ANTICIPATED IMPACT

There are no National Park and Archaeological monuments within project area. There are no migratory corridors, migratory avian-fauna, rare endemic and endangered species. There are no wild animals in the area. No breeding and nesting site were identified in project site. No National Park and Wildlife Sanctuary found within 10km radius. The dumps / bunds around the mine itself act as a good barrier for entry of stray animals. In the post mining stage, barbed wire fencing is proposed all around the mined-out void to prevent fall of animals in the mine pits.

MITIGATION MEASURES

To reduce the adverse effects on natural flora/fauna status of the area due to deposition of dust generated from mining operations, water sprinkling and water spraying systems will be ensured in all dust prone areas to arrest dust generation. Methodical and well-planned plantation scheme will be carried out.

4.5.1 GREENBELT DEVELOPMENT PLAN

Year	No. of trees proposed to be planted	Survival %	Area to be planted	Name of the species
I	It is proposed to plant 4200 Nos of trees in the 1st year	80 %	7.5m Safety barrier, Panchayat Road and nearby village roads	Neem, Pongamia, Pinnata, Ashoka etc.,

4.6 SOCIO ECONOMIC ENVIRONMENT

ANTICIPATED IMPACT

- Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area.
- Approach roads can be damaged by the movement of tippers
- Increase in Employment opportunities both direct and indirect thereby increasing economic status of people of the region.

MITIGATION MEASURES

- Good maintenance practices will be adopted for plant machinery and equipment, which will help to avert potential noise problems.
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.
- Appropriate air pollution control measure will be taken to minimize the environmental impact within the core zone.
- For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per mines act and rules.
- Benefit to the State and the Central governments through financial revenues by way of royalty, tax, DMF, NMET etc, from this project directly and indirectly.

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

The site has been selected based on geological investigation and exploration as below:

- Occurrence of minerals at the specific site.
- Transportation facility for materials & manpower.
- Overall impact on environment and mitigation feasibility
- Socio – economic background.

The mineral deposits are site specific in nature; hence question of seeking alternate site does not arise for this project.

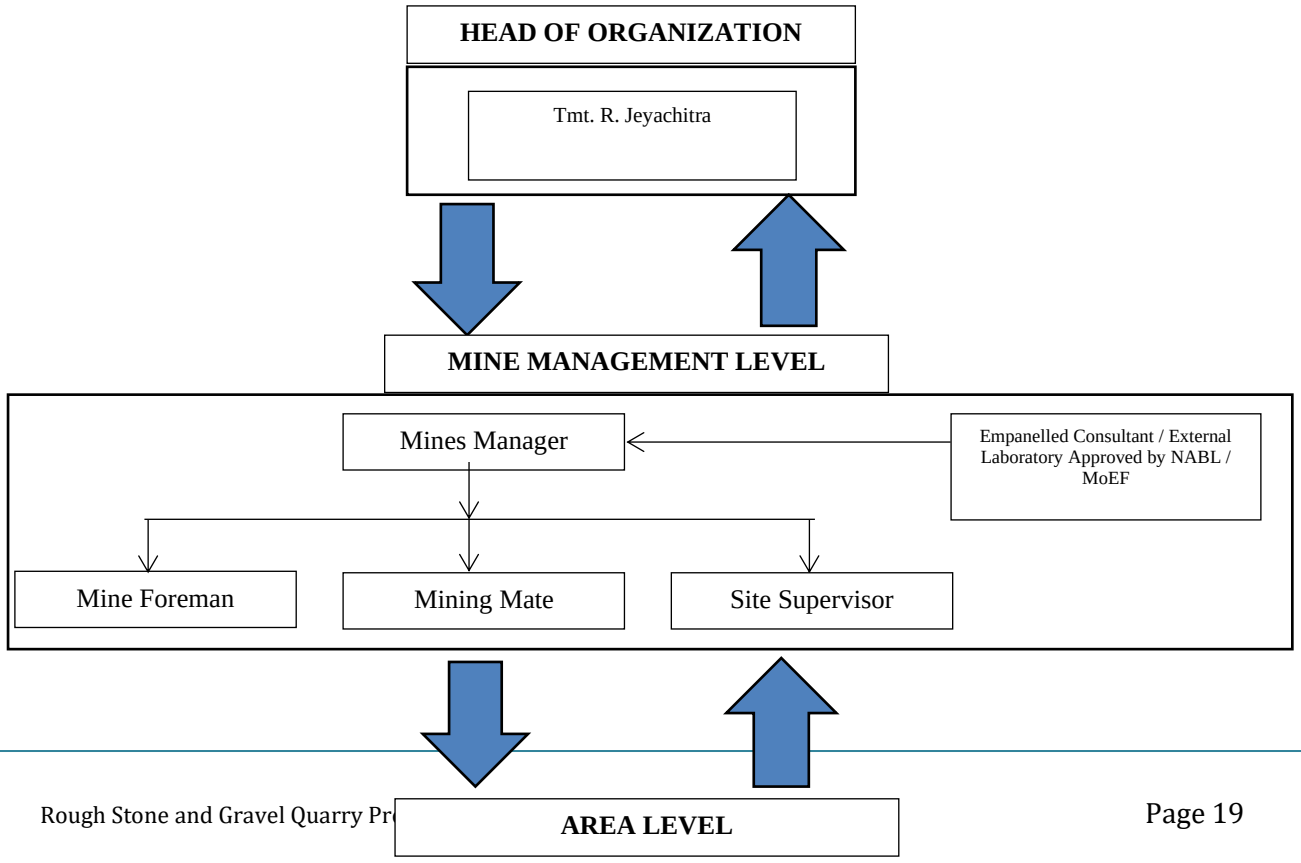
6. ENVIRONMENT MONITORING PROGRAM

Usually, an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by natural or human activities. Hence regular monitoring program of Environmental parameters is essential to take into account the changes in the Environment.

The Objective of Monitoring -

- To check or assess the efficiency of the controlling measures;
- To establish a data base for future impact assessment studies.

6.1 ENVIRONMENTAL MONITORING CELL



6.2 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE

Proposal					
S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, $PM_{2.5}$, PM_{10}, SO_2 and NO_x.
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall
3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in bgl
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	–	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

7. ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31st December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities.

The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

7.2 DISASTER MANAGEMENT PLAN FOR

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

- Rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

7.3 CUMULATIVE IMPACT STUDY

CUMULATIVE PRODUCTION LOAD OF ROUGH STONE

Proposed Quarry Project				
Quarry	**Production for Ten/five-year plan period considering safety parameters**	**Per Year Production in m^3**	**Per Day Production in m^3**	**Number of Lorry Load Per Day @ $12m^3$ per load**
P1	9,15,400	91,540	305	28Trips /Day
List of Existing Quarry				
Quarry	**Production for five-year plan period**	**Per Year Production in m^3**	**Per Day Production in m^3**	**Number of Lorry Load Per Day @ $12m^3$ per load**
E-1	11,31,505	2,26,301	754	63Trips /Day
G. Total	**20,46,905**	**3,17,841**	**1,059**	**91 Trips/ Day**

CUMULATIVE PRODUCTION LOAD OF GRAVEL

Proposed Quarry Project				
Quarry	**Production for three-year plan period considering safety parameters**	**Per Year Production in m^3**	**Per Day Production in m^3**	**Number of Lorry Load Per Day @ $12m^3$ per load**
P1	1,96,550	65,517	218	18 Trips /Day
List of Existing Quarry				
Quarry	**Production for three-year plan period**	**Per Year Production in m^3**	**Per Day Production in m^3**	**Number of Lorry Load Per Day @ $12m^3$ per load**
E-1	84,766	28,255	94	8Trips /Day
G. Total	**2,81,316**	**93,772**	**312**	**26 Trips/ Day**

SOCIO ECONOMIC BENEFITS FROM CLUSTER

PROPOSAL QUARRY			
Code	**Employment**	**Project Cost**	**CER**
P1	31	Rs.,4,07,14,000/-	Rs 5,00,000/-
EXISTING QUARRY			
Code	**Employment**	**Project Cost**	**CER**
E1	35	Rs. 3,07,78,000/-	Rs 5,00,000/-
Grand Total	**66**	**Rs.7,14,92,000 /-**	**Rs. 10,00,000/-**

GREENBELT DEVELOPMENT BENEFITS FROM PROPOSAL MINE

Proposed project				
CODE	**No of Trees proposed to be planted**	**Survival %**	**Area to be covered**	**Name of the Species**
Tmt. R. Jeyachitra	4200	80	7.5m Safety barrier, Panchayat Road and Village roads	Neem, Pongamia, Pinnata, ashoka etc.,

8. PROJECT BENEFITS

Tmt. R. Jeyachitra Rough Stone and Gravel Quarry Project aims to produce 9,15,400m^3 Rough Stone over a period of 10 Years, 1,96,550 m^3 of Gravel over a period of 3 Years.

This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits

- Increase in Employment Potential
- Improvement in Socio-Economic Welfare
- Improvement in Physical Infrastructure
- Improvement in Social infrastructure

9. ENVIRONMENT MANAGEMENT PLAN FOR PROPOSED QUARRY

The Environment Monitoring Cell formed by the mine management will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level.

The said team will be responsible for:

- Monitoring of the water/ waste water quality, air quality and solid waste generated
- Analysis of the water and air samples collected through external laboratory
- Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- Co-ordination of the environment related activities within the project as well as with outside agencies
- Collection of health statistics of the workers and population of the surrounding villages
- Green belt development
- Monitoring the progress of implementation of the environmental monitoring programme
- Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

10. CONCLUSION

It can be concluded from overall assessment of the impacts, in terms of positive and negative effects on various environmental components, that the mining activities will not have any adverse effect on the surrounding environment.

To mitigate any impacts due to the mining activities, a well-planned EMP and a detailed post project monitoring system is provided for regular monitoring and immediate rectification at site. Due to the cluster quarrying activities, socio economic conditions in and around the project site will be improved substantially. Hence, the Prior Environmental Clearance shall be granted at the earliest.